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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/626,132	07/23/2003	Babak Sadigh	IL-10750C	9371
7590	06/30/2004		EXAMINER	
Alan H. Thompson Assistant Laboratory Counsel Lawrence Livermore National Laboratory P.O. Box 808, L-703 Livermore, CA 94551			STEIN, STEPHEN J	
			ART UNIT	PAPER NUMBER
			1775	
			DATE MAILED: 06/30/2004	

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/626,132	SADIGH ET AL. <i>[Signature]</i>
	Examiner	Art Unit
	Stephen J Stein	1775

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on ____.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) Claim(s) ____ is/are allowed.
- 6) Claim(s) 1-5,7 and 8 is/are rejected.
- 7) Claim(s) 6 is/are objected to.
- 8) Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on ____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. ____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1 and 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. Claim 1 is indefinite since it recites properties without any accompanying compositional limitations which would meet this property. See *Ex Parte Slob* 157 USPQ 182 (1967).
4. Claim 8 recites the limitation "S:B₃". It is unclear to the examiner how this limitation limits the scope of the claims. Does applicant mean to claim SiB₃?

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claim 7 are rejected under 35 U.S.C. 102(e) as being anticipated by US 6,133,120 (Miyajima et al.).

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Miyajima teaches p-type single crystal silicon carbide semiconductor doped with boron (See abstract).

7. Claims 1, 4 and 5 are rejected under 35 U.S.C. 102(e) as being anticipated by US 6,238,941 (Dutartre et al.).

Dutartre teaches a single crystal silicon substrate with an epitaxial layer of $\text{Si}_x\text{Ge}_{1-x}$ (col. 2, lines 47-63). With regard to the claimed equilibrium dopant solubility of boron or indium, it is expected that the disclosed structure will exhibit this property since it is the same structure as claimed by applicant.

8. Claims 1, 4 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by US 5,329,257 (Ismail).

Ismail teaches a doped $\text{Si}_x\text{Ge}_{1-x}$ grown on silicon semiconductor substrate (col. 3). With regard to the claimed equilibrium dopant solubility of boron or indium, it is expected that the disclosed structure will exhibit this property since it is the same structure as claimed by applicant.

9. Claim 7 is rejected under 35 U.S.C. 102(e) as being anticipated by US 6,663,708 (Morita).

Morita teaches a boron doped p-type semiconductor silicon ingots which are sliced to produce boron doped p-type silicon semiconductor wafers (See example 24).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,939,043

(Biricik et al).

Biricik teaches a window comprising a zinc sulfide substrate having a semiconductor silicon coating applied wherein the silicon coating may include boron or indium dopants (See col. 2, lines 19-45 and col. 8, lines 25-36). Although the reference does not teach any particular direction on the substrate of which the silicon coating is grown, absent a showing of criticality with respect to growth direction (a result effective variable), it would have been obvious to one of ordinary skill in the art to optimize the growth direction through routine experimentation. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). With regard to the claimed equilibrium dopant solubility of boron or indium, it is expected that the disclosed structure will exhibit this property since it is the same structure as claimed by applicant.

Allowable Subject Matter

12. Claim 6 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. The following is a statement of reasons for the indication of allowable subject matter:
The prior art of record fails to teach or suggest a semiconductor material having a equilibrium

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dopant solubility of boron or indium of greater than 1% wherein the semiconductor material comprises silicon grown on a Aluminum phosphate (AlP) substrate along a (001) direction.

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen Stein whose telephone number is 572-272-1544. The examiner can normally be reached on Monday through Friday from 8:30 a.m. to 5:00 p.m. If the attempts to reach the examiner are unsuccessful, the examiner's supervisor, Deborah Jones can be reached by dialing 571-272-1535. The official fax number is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

June 25, 2004



Stephen J. Stein
Primary Examiner
Art Unit 1775